DNA-PPCx

PowerDNA® PowerPC I/O Cubes

- Flexible enough to match your application
- Over 30 I/O boards available
- Standard Ethernet 100BaseT Interface (Fiber interface available)
- Inter-Cube sync interface
- Supports Standalone operations as a logger or deployed with embedded Linux application.
- Rugged and Compact
    - 4" x 4.1" x 4" provides 3 I/O slots (DNA-PPC5)
    - 4" x 4.1" x 5.8" provides 6 I/O slots (DNA-PPC8)
- Stream data over Ethernet
- Real-time: 1000 I/O scans in < 1 millisecond
- Complete Windows, Linux and RT OS support
- LabVIEW™, MATLAB®, DASYLab™ support and more

10-Year Availability Guarantee

DNA-PPC5 shown

Core Module consists of NIC and PowerPC CPU layers stacked on top of each other and packaged in light-weight aluminum chassis.

General Description:

The PowerDNA® (**D**istributed **N**etworked **A**utomation) Cube is a compact, rugged, Ethernet based DAQ interface. Its flexibility allows you to configure one or more cubes to match the specific I/O requirements of your application. The PowerDNA Cube is ideally suited for a wide variety of industrial, aerospace and laboratory data acquisition and control applications.

The heart of every PowerDNA system is the Cube. The PowerDNA Cubes are 4" x 4" x 4" (3 I/O slots), or 4" x 4" x 5.8" (6 I/O slots) and are packed with power and flexibility. Each I/O Cube consists of two primary subsections: a Core Module and I/O slots or layers.

The Core Module occupies the top portion of the Cube and provides the PowerPC CPU, Ethernet Network Interface Controller (NIC), indicator lights, timing/trigger interface, configuration ports and internal power supply. It's the brains of the Cube and controls the unit's operations including the interface with the host Controller (and other Cubes) and supervising the activity of the I/O Layers.

The remainder of the Cube is dedicated to I/O slots or layers. These slots are populated with the I/O modules that are selected to match your process or test application. With over 30 different I/O boards available we're sure to have just what your application requires. We currently offer: Analog input boards to measure voltage, current, strain gages, thermocouples and more, Analog output boards with outputs to ±40V or ±50 mA, Digital I/O interfaces for logic and "real-world" signal levels, counters and timers, quadrature encoder inputs, and Communications interfaces for RS-232, RS-422/485 and the CAN bus.

The host communicates with the cube in one of three ways. The first is simple, single point, programmed I/O. This mode is simple and is suitable for most systems where high speed or precise sample timing is not required. The second is the ACB (Advanced Circular Buffer). In ACB mode data is written to and from buffers on the I/O boards rather than directly to the Ethernet port. ACB mode is preferred for high speed acquisition/control or where precise timing is required as the buffers are large enough to assure data is not lost due to Ethernet timing latencies. The third mode is DMAP. In DMAP mode cubes use our patented DAQBIOS Ethernet protocol to assure deterministic real-time performance and achieve sub-millisecond response times across more than 1000 I/O (analog and/or digital) points

No system is complete without software. The PowerDNA Cube is supported by all the popular Windows, Linux and Real-time operating systems. Our UEIDAQ Framework provides a simple and universal API and supports all common programming languages. The Cube is also fully supported by an extensive array of application packages including LabVIEW, MATLAB, DASYLab and more.

The PowerDNA cubes offer a wide variety of mounting options. A flange kit is available that allows the cubes to be mounted to a wall or other flat surface. Rack kits and DIN Rail kits are available to allow mounting in 19" racks or on DIN rails respectively. For portable applications there is even an attaché style carrying case that will safely hold a cube, its power supply, cables and screw terminal panels.

Standalone Data Recorder/Logger operation is also available based on the PowerDNA Cube architecture. (Please see our UEILOGGER family) Should you decide you need the stand alone capability, the

Block Diagram:
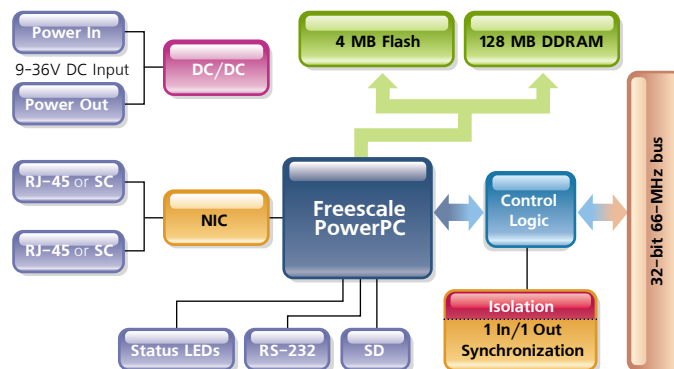
General Description (continued):

PPC series cubes may be upgraded to UEILogger. The embedded Linux tool kit allows users to develop custom DAQ and control applications on their PC and then deploy them to run standalone on PPC series cubes (call for availability of this toolkit).

Whether your application requires a few I/O channels or a few thousand, the PowerDNA cube is an ideal solution. The Cubes' unique combination of flexibility, compact size, mechanical and electrical ruggedness and ease of use is unparalleled.

Technical Specifications:

Standard Interfaces	
To Host Computer	10/100Base-T, standard RJ-45 connector
Daisy chain output	10/100Base-T, standard RJ-45 connector
Config/General	RS-232, 9-pin "D"
Sync	Custom cable to sync multiple cubes
I/O Slots Available	
DNA-PPC8	6 slots
DNA-PPC5	3 slots
Host Communications	
Distance from host	100 meters max, CAT5 cable
Ethernet data transfer rate	2 megabyte per second
Analog data transfer rate	up to 1 megasample per sec (16-bit samples)
DMAP I/O mode	update 1000 I/O channels (analog and/or digital) in less than 1 millisecond, guaranteed
Processor	
CPU	Freescale MPC5200, 400 MHz, 32-bit
Memory	128 MB (not including on-board Flash Memory which contains OS kernel, I/O drivers and firmware)
Status LEDs	Attention, Read/Write, Power, Communications Active
Environmental	
Temp (operating)	Tested to -40 °C to 85 °C
Temp (storage)	-40 °C to 100 °C
Humidity	0 to 95%, non-condensing
Vibration	
(IEC 60068-2-64)	10–500 Hz, 5 g (rms), Broad-band random
(IEC 60068-2-6)	10–500 Hz, 5 g, Sinusoidal
Shock	
(IEC 60068-2-27)	50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations
Altitude	70,000 feet, maximum
Physical Dimensions	
DNA-PPC5	4.1" x 4.0" x 4.0"
DNA-PPC8	4.1" x 4.0" x 5.8"
Power Requirements	
Voltage	9 - 36 VDC (AC adaptor included)
Power Dissipation	4 W at 24 VDC (not including I/O boards)

PowerDNA Advantages:

Easy to configure and deploy
- Over 30 different I/O boards available
- Built-in signal conditioning
- Ethernet based
- Flange kit for mounting to wall/flat surface
- DIN rail and Rack Mount kits
- Attach style carrying case available for portable deployments
- Standard "Off-the-shelf" products and delivery

True Real-time Performance
- 1 msec updates guaranteed with 1000 I/O
- Up to 1 million samples per second
- Use QNX, RTX, RT Linux, RTAI Linux, LabVIEW RT

Flexible Connectivity
- 100Base-T with Cat-5 cable
- 10/100Base-FX Fiber interface available (see DNA-FPPC family)
- Supports WIFI / GSM / Cell networks
- Built-in Ethernet switch allows daisy chain

Compact Size:
- 4" x 4" x 6" or 4" x 4" x 4" cubes
- 150 analog inputs per cube,
- 48 analog outputs per cube
- 288 digital I/O bits per cube.
- 48 counter/quadrature channels per cube

Low Power:
- Less than 15 watts per cube
- AC, 9-36 VDC or battery powered.

Stand Alone Data Logger and PAC Modes
- DNA-PPC series cubes can be upgraded with UEILOGGER series capabilities
- DNA-PPC series cubes can be upgraded with UEIPAC series capabilities

Rugged and Industrial:
- All Aluminum construction
- Operation tested from -40°C to 85°C
- Vibration tested to 5 g, (operating)
- Shock tested to 50 g (operating)
- All I/O isolated from Cube and host PC.
- Operation to 70,000 feet

Outstanding Software support
- Windows, Linux, RT Linux, Windows RT, RTX and QNX operating systems
- VB, VB .NET, C, C#, C++, J#
- MATLAB, LabVIEW, LabVIEW RT, DASYLab, OPC, ActiveX support

Cost effective
- Cubes start at under $1000 (US list price)
- I/O boards start at $600 (US list price)

PowerDNA Cube Interface:

A ## Network Connectors

Ethernet in from host PC or from another Cube; second connector daisychains the network to another Cube. You can select from models that provide RJ45 jacks for copper cabling or SC-type jacks that accommodate 100-Base FX optical cable.

B ## USB Port

USB Ver 1.1 port is not currently active.

C ## SD Card Slot

Secure Digital (SD) Card slot for onboard data storage. The SD Card is used as the data storage media in the UEILogger series. It is also stores both data and linux embedded programs deployed on the cube using the soon to be released embedded toolkit. Supports FAT12, FAT16 and FAT32 filesystems.

D ## Serial Port

Using the supplied serial cable, you perform initial PowerDNA setup of the operating parameters from any serial terminal running at 57,600 baud/8 data bits/no parity/1 stop bit. From a terminal program you can, for instance, change the IP address from the default, if necessary. You also download updated firmware through the serial port. The serial port is usable for RS-232 communications.
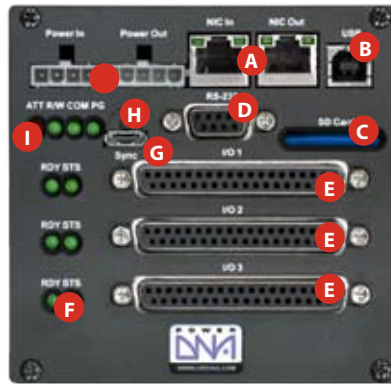
E ## I/O Board Slots

Cubes provide either 3 or 6 I/O slots. Boards installed in the I/O slots perform the various analog, digital and communications functions you need for your specific application. Your signals may be connected directly to the I/O boards via your custom cabling or take advantage of our wide variety of easy-to-use, external screw terminal panels. Boards ordered with your cube are factory installed. It is also a simple task to add boards or reconfigure a cube in the field

F ## I/O Layer Status LEDs

These two green lights give a visual indication of the status of each I/O layer.

RDY - *Ready* • **STS** - *Status*

G ## Sync Connector

High-speed Cube-to-Cube synchronization connector.

H ## Reset Button

Recessed to prevent accidental activation, this button resets the CPU layer for activities such as downloading and installing new firmware for the Cube.

I ## Communication Status LEDs

These LEDs monitor communications through the serial and infrared ports.

ATT - *Attention* • **R/W** - *Read/Write*
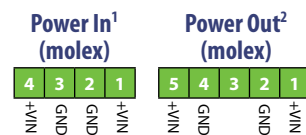**COM** - *Communications underway*
PG - *Power Good / Ready*

J ## Power Connectors

Power-In, 9-36V DC either from the DNA-PSU-24 (included with the Cube), a user-supplied source, or daisychained from another PowerDNA Cube.

Power-Out (same voltage as applied to Power-In) to another Cube, if desired.
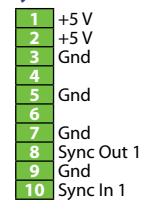
Pinout Diagrams:

Power In[1] (molex)

4	3	2	1
+VIN	GND	GND	+VIN

Power Out[2] (molex)

5	4	3	2	1
+VIN	GND		GND	+VIN

[1] *Mating connector available from Digikey, Molex PN 39-01-4040*
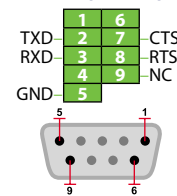[2] *Mating connector available from Digikey, Molex PN 39-01-4050*
[3] *Internal pull-up, start/stop trigger should connect SYNC_IN with SYNC_GND*

Synchronization

1	+5 V
2	+5 V
3	Gnd
4	
5	Gnd
6	
7	Gnd
8	Sync Out 1
9	Gnd
10	Sync In 1

Serial (RS-232)

TXD	1	6
	2	7	CTS
RXD	3	8	RTS
	4	9	NC
GND	5	

Ordering Guide:

Part Number	Description
PPC Cubes (includes universal AC power supply, serial and ethernet cables)	
DNA-PPC5	100Base-T I/O Cube, 3 I/O slots, PowerPC CPU, sync interface, upgradeable
DNA-PPC8	100Base-T I/O Cube, 6 I/O slots, PowerPC CPU, sync interface, upgradeable
Upgrades	
UEILogger UPG	Upgrade any PowerPC Cube to the UEILogger series
UEIPAC UPG	Upgrade any PowerPC Cube to the UEIPAC Programmable Automation Controller series
Accessories	
DNA-FAN5	Rear-mount fan for PowerDNA 5-layer Cube
DNA-FAN8	Rear-mount fan for PowerDNA 8-layer Cube
DNA-DR5	Rear-mount DIN rail clip for PowerDNA 5-layer Cube
DNA-DR8	Rear-mount DIN rail clip for PowerDNA 8-layer Cube
DNA-FLANGE	Bottom-mount flange assembly allows cube to be mounted to any flat surface
DNA-CASE	Light-weight plastic carrying case for PowerDNA Cube
DNA-ACCESSORY	PowerDNA accessories kit includes spare universal AC power supply and serial/ethernet cabels
DNA-19RACKW	19" rackmount enclosure with DIN rail attached
DNA-SD4GB	Ultra high-speed SD card; 4GB capacity
DNA-CBL-37S	3 foot, 37 conductor shielded cable